Credit Name: CSE 2140 2nd Language Programming
Assignment Name: GuessingGame Mastery
How has your program changed from planning to coding to now? Please explain?

PLANNING:

I plan to declare the variables, prepare a scanner for userinput, prompt the intro message and prompt the user for a, b, and c values.

(discriminant =D)

The program should then calculate the discriminant and decide whether D=0, D<0, or D>0. If D=0, the program should calculate the one real number root, and print it. If D>0, then the program should calculate the two real number roots and print them. If D<0, the program should calculate the two imaginary number roots, and print them.

CODING:

I started the program by declarint the two root variables, preparing the scanner for userinput, and prompting the user the introduction message explaining the program.

```
//Declare the variables
    double root1;
    double root2;

//prepare scanner for userinput
Scanner userInput = new Scanner(System.in);

//prompt user introduction message, explaining the program
System.out.println("This program calculates the root(s) of any quadratic equation!");
```

Then I prompted the user for the values of a, b , and c. The program takes those values, stores them in the correct variable, and uses the variable value to calculate the discriminant.

```
// Prompt the user for values of a, b, and c in the quadratic equation
System.out.println("Enter value for a: ");
double a = userInput.nextInt();

System.out.println("Enter value for b: ");
double b = userInput.nextInt();

System.out.println("Enter value for c: ");
double c = userInput.nextInt();

// Calculating the discriminant (b^2 * 4*a*c)
double discriminant = (b * b - 4 * a * c);
```

Using the value of the discriminant, the program selects the proper calculation to convey using an if statement. When the D>0 (two real roots), the two real number roots are calculated and printed in a way in which the values are displayed in a table.

```
// Determining if the root has 2 real solutions, one repeated solution, or two imaginary solutions
//based on the discciminant, program outputs the roots respectively

if (discriminant > 0) {

    // Two real roots
    root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
    root2 = (-b - Math.sqrt(discriminant)) / (2 * a);
    System.out.printf("Discriminant is >0, There are two real roots.\nRoot 1: %.2f\nRoot 2: %.2f\n", root1, root2);
```

When the D = 0 (one real/repeated root), the program calculates the value of the root and prints it in a table shape.

```
} if (discriminant == 0) {

    // One real root
    double root = -b / (2 * a);
    System.out.printf("Discriminant is = 0, There is a repeated solution (one root).\nRoot: %.2f\n", root);
```

When the D < 0 (two complex/imaginary number roots), the two roots are calculated and the real and imaginary part of each root are printed in a table format.

```
} else if (discriminant < 0){

    // two Complex roots
    double realPart = -b / (2 * a);
    double imaginaryPart = Math.sqrt(-discriminant) / (2 * a);
    System.out.printf("Roots are complex.\nRoot 1: %.2f + %.2fi\nRoot 2: %.2f - %.2fi\n", realPart, imaginaryPart, realPart, imaginaryPart);
```

End of Program!